

# Cageless 249 Series Displacer Sensors

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Figure 1. Type 249V Sensor with DLC3000 Series Digital Level Controller

## Introduction

### Scope of Manual

This instruction manual includes maintenance and parts ordering information for the cageless 249 Series sensors.

Although a Type 249 sensor is usually shipped with attached controller or transmitter, this manual does not include operation, installation, calibration, maintenance, and parts ordering information for the controller/transmitter or for the complete unit. For this information, refer to the appropriate controller/transmitter instruction manual.

No person may install, operate or maintain a cageless Type 249 Series sensor without first ● being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance, and ● carefully reading and understanding the contents of this manual. If you have any questions about these instructions, contact your Fisher sales office.

### Description

The 249 Series sensors are designed to measure liquid level, interface level, or density/specific gravity inside a process vessel.

A torque tube assembly (figure 2) and displacer provide an indication of liquid level, interface level, or density/specific gravity. The torque tube assembly consists of a hollow torque tube with a shaft welded inside it at one end and protruding from it at the other end.

The unconnected end of the tube is sealed by a gasket and clamped rigidly to the torque tube arm, permitting the protruding end of the shaft to twist and therefore transmit rotary motion. This allows the interior of the torque tube to remain at atmospheric pressure, thus eliminating packing and the disadvantages of packing friction.

The displacer always exerts a downward force on one end of the displacer rod. The other end of the displacer rod rests on the knife-edge of the driver bearing. A keyed shaft on the bearing end of the



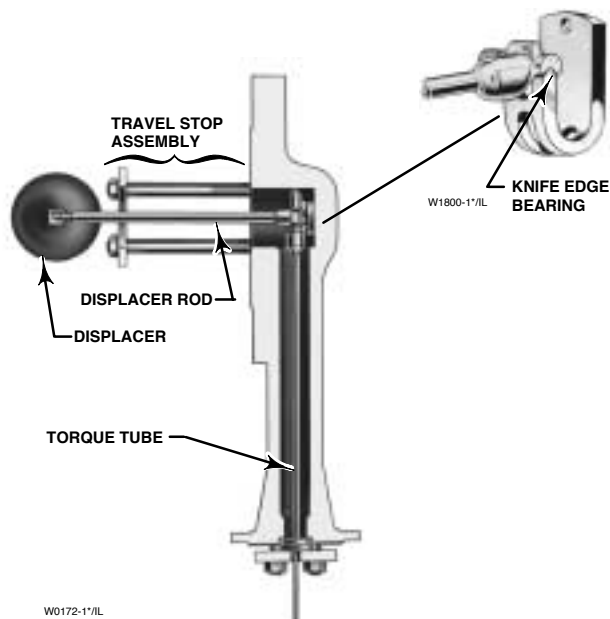


Figure 2. Typical Side-Mounted Cageless Displacer

displacer fits into a socket on the outside of the welded end of the torque tube assembly.

A change in liquid level, interface level, or density/specific gravity buoys up the displacer by a force equal to the weight of the liquid displaced. Corresponding vertical movement of the displacer results in angular movement of the displacer rod around the knife edge. Since the torque tube assembly is a torsional spring which supports the displacer and determines the amount of movement of the displacer rod for a given displacement change, it will twist a specific amount for each increment of buoyancy change. This rotation is brought through the torque tube arm by the protruding rotary shaft. A controller or transmitter attached to the end of the rotary shaft converts the rotary motion into varying pneumatic or electric signals.

## Type Number Description

- **Type 249BP**—Class 150, 300, 600 steel top-mounted sensor.
- **Type 249CP**—Class 150, 300, 600 stainless steel top-mounted sensor.
- **Type 249P**—Class 900 and 1500 steel top-mounted sensor

- **Type 249V**—Class 125 or 250 cast iron or Class 150, 300, 600, 900, or 1500 steel side-mounted sensor.

All cageless 249 Series sensors have flanged connections.

The Parts List section shows some Type 249 sizes by construction, standard displacer lengths, and standard materials. However, Type 249 parts are available in a wide variety of materials of construction, part dimensions, and other specifications. Contact your Fisher sales office for assistance in selection of specific materials, dimensions, and specifications.

## Educational Services

For information on available courses for 249 Series displacer sensors, as well as a variety of other products, contact:

Emerson Process Management  
 Educational Services, Registration  
 P.O. Box 190; 301 S. 1st Ave.  
 Marshalltown, IA 50158-2823  
 Phone: 800-338-8158 or  
 Phone: 641-754-3771  
 FAX: 641-754-3431  
 e-mail: education@emersonprocess.com

### Note

**Fisher does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, or maintenance of any Fisher product remains solely with the purchaser and end-user.**

## Maintenance

Sensor parts are subject to normal wear and must be inspected regularly and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions.



**Always wear protective clothing and eyewear when performing any maintenance operations to avoid personal injury.**

Avoid personal injury or property damage resulting from the sudden release of pressure. Before performing any maintenance procedure:

- Relieve any process pressure in the process vessel where the Type 249 sensor is installed.
- Drain the process liquid from the process vessel.
- Shut off any electrical or pneumatic input to the controller or transmitter attached to the Type 249 sensor and vent any pneumatic supply pressure.
- Use caution when loosening flange bolting or pipe plugs (key 26).
- Remove the controller or transmitter from the torque tube arm (key 3).

Before performing any maintenance procedure requiring the handling of the displacer, inspect the displacer (key 10) to make sure process pressure or liquids have not penetrated the displacer.

The displacer in this unit is a sealed container. If penetrated by process pressure or liquid, the displacer may hold pressure or hazardous liquid for an extended period. A displacer that has been penetrated by process pressure or liquid may contain:

- pressure as a result of being in a pressurized vessel.
- liquid that becomes pressurized due to a change in temperature.
- liquid that is flammable, corrosive, or hazardous.

Sudden release of pressure, contact with hazardous liquid, fire, or explosion, which might result in personal injury or property damage, can occur if a displacer that is retaining pressure or process liquid is punctured, subjected to heat, or repaired.

Handle the displacer with care. Consider the characteristics of the specific process liquid in use.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

### Note

Except for gaskets (keys 13, 14), trouble symptoms peculiar to specific parts are discussed in the following sections. Each section is specific to these parts. Regardless of location, gasket failure is indicated by leakage in the gasket area. Every time a gasket is removed, replace it with a new one upon reassembly.

The procedures below apply to all sensor types except where indicated. Key numbers used are shown in the following illustrations:

- Type 249BP—figure 5
- Type 249CP—figure 6
- Type 249P—figure 7
- Type 249V—figure 8

## Removing the Displacer and Stem

The displacer (key 10) is a sealed container. If the displacer has been penetrated by process pressure or liquid, it may hold pressure or hazardous liquid for an extended period.

Process residue buildup on the displacer and stem (key 24) may change displacer weight or displacement. A bent stem or a dented or corroded displacer can impair performance.

If the displacer rests against the travel stop, appears to be overweight, or causes output drift or other output inaccuracies, it may have been penetrated by process pressure or liquid. Such a displacer may contain pressure because it was in a pressurized vessel, may contain process liquid that becomes pressurized due to a change in temperature, and may contain process liquid that is flammable, hazardous or corrosive.



**Sudden release of pressure, contact with hazardous liquid, fire, or**

**explosion, which may result in personal injury or property damage, can occur if a displacer that is retaining pressure or process liquid is punctured, subjected to heat, or repaired.**

Handle the displacer with care.

**Note**

**On the Types 249V, 249P, and 249BP with travel stop, the displacer must come out with the sensor head (key 2) or torque tube arm (key 3) before being completely disconnected from the displacer rod (key 7). If separating the displacer and displacer rod, remove the cotter spring (key 11).**

**CAUTION**

**Be careful not to let the displacer slip and drop into the bottom of the process vessel, as displacer damage could result.**

1. Before starting any maintenance procedure, be sure the following safety actions are completed.
  - Relieve process pressure in the process vessel where the Type 249 sensor is installed.
  - Drain the process liquid from the process vessel.
  - Shut off any electrical or pneumatic input to the controller or transmitter attached to the Type 249 sensor and vent any pneumatic supply pressure. Remove the controller or transmitter from the torque tube arm.
  - Use caution when loosening flange bolting or pipe plugs.
  - Be sure process pressure or liquids have not penetrated the displacer.

2. Support the sensor head (key 2) and the torque tube arm (key 3). Remove the bolting that holds the sensor head to the process vessel.

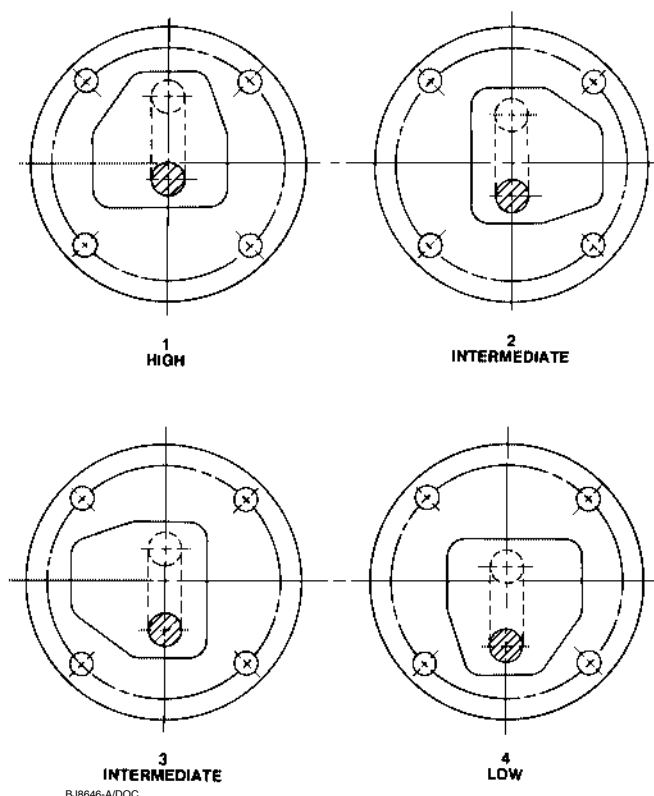


Figure 3. Type 249V Travel Stop Plate Positions

**CAUTION**

**When removing a sensor from a process vessel, the displacer may remain attached to the displacer rod and be lifted out with the sensor head (key 2) when the sensor head is removed. If separating the displacer and displacer rod before removing the sensor head, remove the cotter spring (key 11).**

**Be careful not to let the displacer slip and drop into the bottom of the process vessel, as displacer damage could result.**

3. Carefully remove the sensor head or torque tube arm. If the displacer comes out with the head or torque tube arm, be careful not to damage the displacer or bend the stem when setting the head or arm down.

4. On the Type 249V, the travel stop plate can be located in one of four positions as shown in figure 3. With a standard or thin-walled displacer hanging free

on the displacer rod, the rod should not touch the plate. If it does, remove the plate and choose a position where the rod will not touch the plate.

5. Follow the procedure for replacing the displacer, displacer rod assembly, cotter spring, stem end piece, and displacer spud as necessary.

### Replacing the Displacer, Cotter Spring, Stem End Piece, and Displacer Spud

The cotter spring (key 11), the ball on the displacer rod/driver assembly (key 7), and the stem end piece or displacer stem connector (key 23) may be either too worn for a secure connection or so clogged or corroded that the displacer does not pivot properly. Replace these parts, as necessary.

#### CAUTION

**If the displacer is to be disconnected from the displacer rod before being removed from the process vessel, provide a suitable means of supporting the displacer to prevent it from dropping into the process vessel and being damaged.**

1. After following the proper procedure to remove the sensor head and the displacer from the process vessel, move the sensor assembly to a suitable maintenance area. Support the assembly to avoid damage to the displacer, displacer stem, displacer rod/driver assembly, and associated parts.
2. To help support the displacer on a unit without travel stop (Type 249BP, 249P, 249CP), install the stem and stem end piece (or a threaded rod) into the 0.25 inch-28 UNF threaded hole in the displacer spud or stem connector. On the Types 249BP with travel stop, the groove pin (key 42) will secure the displacer as long as the travel stop plate (key 41) is installed and the sensor head (key 2) is in position.
3. Reach the cotter spring, displacer spud, ball end of the displacer rod/driver assembly, stem end piece, or displacer stem connector as follows:

- **Top-Mounted Type 249BP, 249CP, and 249P Sensors**—By removing the pipe plug (key 26).

- **Side-Mounted Type 249V Sensor**—By removing the process vessel bolting and pulling out the torque tube arm (key 3). The inside of the process vessel wall will cause the displacer to swing

up so it can be pulled out through the vessel opening.

4. Remove the cotter spring to free the displacer or stem end piece from the ball end of the displacer rod/driver assembly. Lift the displacer or stem end piece from the ball.

5. Replace worn or damaged parts as necessary. Return the displacer or stem end piece to the displacer rod/driver assembly. Install the cotter spring.

6. Install the sensor head and controller/transmitter. Calibrate the controller/transmitter following the procedures given in the controller/transmitter instruction manual.

### Replacing the Displacer Rod/Driver Assembly

The ball on the displacer rod/driver assembly (key 7) may be either too worn for a secure connection or so corroded that the displacer does not pivot properly. Replace the displacer rod/driver assembly, if necessary.

#### CAUTION

**If the displacer is to be disconnected from the displacer rod/driver assembly before being removed from the process vessel, provide a suitable means of supporting the displacer to prevent it from dropping into the process vessel and being damaged.**

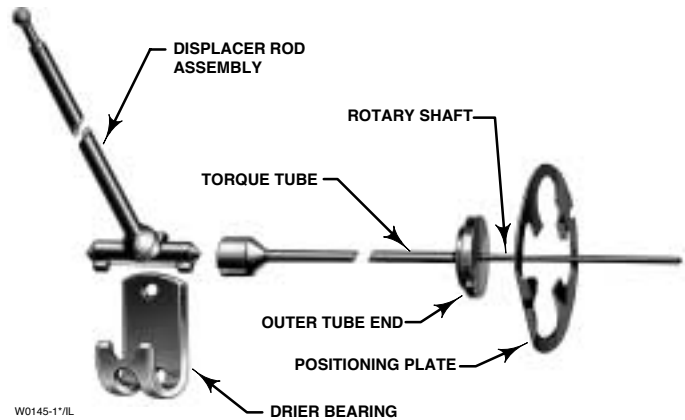
1. After following the proper procedure to remove the sensor head and the displacer from the process vessel, move the sensor assembly to a suitable maintenance area. Support the assembly to avoid damage to the displacer, displacer stem, displacer rod assembly, and associated parts.
2. Remove the controller/transmitter and displacer (key 10). Then, remove the hex nuts (key 20) that hold the torque tube arm (key 3) to the sensor head (key 2). Separate the torque tube arm from the sensor head.
3. Using the proper tool, loosen and then remove the upper bearing driver bolt (key 5). Lift the displacer rod/driver assembly from the knife edge of the driver bearing (key 4). Separate the displacer rod/driver assembly from the end of the torque tube assembly (key 9).
4. If necessary, remove the bearing driver by removing the lower bearing driver bolt. Install a new bearing driver and bolts.

# Cageless 249 Series Sensors



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REMOVAL OR INSTALLATION OF POSITIONING PLATE



EXPLODED VIEW OF TORQUE TUBE AND DISPLACER ROD ASSEMBLY

Figure 4. Torque Tube and Displacer Rod Assemblies

5. If necessary, replace the displacer rod/driver assembly and install it on the knife edge of the bearing driver. Carefully fit the keyed shaft on the bearing end of the displacer rod into a socket on the outside of the welded end of the torque tube assembly.
6. Install the sensor head and controller/transmitter. Calibrate the controller/transmitter following the procedures given in the controller/transmitter instruction manual.

## Replacing the Torque Tube

Corrosion or leakage through the outer end of the torque tube is evidence of deterioration in the torque tube assembly (key 9) or torque tube end gasket (key 14). Erratic or nonexistent rotary shaft output may occur if the socket on the inner end of the torque tube assembly does not engage the bearing end of the displacer rod assembly (key 7).

1. After following the proper procedure to remove the sensor head and the displacer from the process vessel, move the sensor assembly to a suitable maintenance area. Support the assembly to avoid damage to the displacer, displacer stem, displacer rod assembly, and associated parts.
2. Remove the controller/transmitter and displacer (key 10). Then, remove the hex nuts (key 20) that hold the torque tube arm (key 3) to the sensor head (key 2). Separate the torque tube arm from the sensor head.

3. Remove the nuts (key 18) and retaining flange (key 6) holding the positioning plate (key 8) at the end of the torque tube arm.

## CAUTION

**If the displacer is still attached to the displacer rod at this point, be careful not to let the torque tube assembly slip when using the screwdriver leverage procedure in steps 4 and 6. Sudden release of the displacer would cause damage.**

4. Remove the positioning plate (key 8) by freeing its two lugs.

The vertical lug fits into a hole in the flange of the torque tube arm (top of figure 4). The horizontal lug (hidden behind the screwdriver at the bottom of figure 4) fits into a slot in the outer tube end of the torque tube assembly (the figure 4 exploded view shows this lug to the right of the outer tube end).

The positioning plate may be pried away from the torque tube arm and outer tube end if the displacer already has been disconnected from the displacer rod. However, if the displacer is still connected to the displacer rod, place a screwdriver blade in the slots of the positioning plate and outer tube end as shown in figure 4. Slowly turn the positioning plate to release its lug from the torque tube arm. Then, carefully turn the plate back to allow the displacer to come to rest and slip the other lug of the plate from its slot in the outer tube end.

5. Pull the torque tube assembly and tube end gasket out of the torque tube arm.
6. Install a new tube end gasket and insert the torque tube assembly into the torque tube arm as shown in figure 4. Rotate the torque tube assembly until its socket mates with the driver member on the displacer rod assembly and so the outer tube flange rests against the gasket. With a thumb on the upper portion of the positioning plate and a screwdriver in the slots as shown in figure 4, rotate the plate and press the lug on the plate into the hole in the torque tube arm.
7. Install the retaining flange and secure it with four nuts (key 18), being sure to tighten all nuts evenly.
8. Install the sensor head and controller/transmitter. Calibrate the controller/transmitter following the procedures given in the controller/transmitter instruction manual.

## Replacing the Torque Tube Arm and Changing the Mounting

Looseness of the driver bearing (key 4), wear on its knife-edged surface, or a bent, worn, or corroded displacer rod assembly (key 7) may impair performance. Be especially sure to check the ball on the displacer rod.

1. After following the proper procedure to remove the sensor head and the displacer from the process vessel, move the sensor assembly to a suitable maintenance area. Support the assembly to avoid damage to the displacer, displacer stem, displacer rod assembly, and associated parts.
2. Remove the controller/transmitter and displacer (key 10). Then, remove the hex nuts (key 20) that hold the torque tube arm (key 3) to the sensor head (key 2). Separate the torque tube arm from the sensor head.
3. Follow the proper procedure to remove the torque tube assembly (key 9).
4. Remove the bearing bolts (key 5), displacer rod assembly, and driver bearing.

### Note

**Be sure to install the driver bearing so its knife edge is pointing up when the torque tube arm is mounted in the desired orientation. Since changing the mounting position of the torque tube arm by 180° will change controller or transmitter action from direct to reverse or vice versa, controller/transmitter action must be reversed from what it was before the mounting method was changed.**

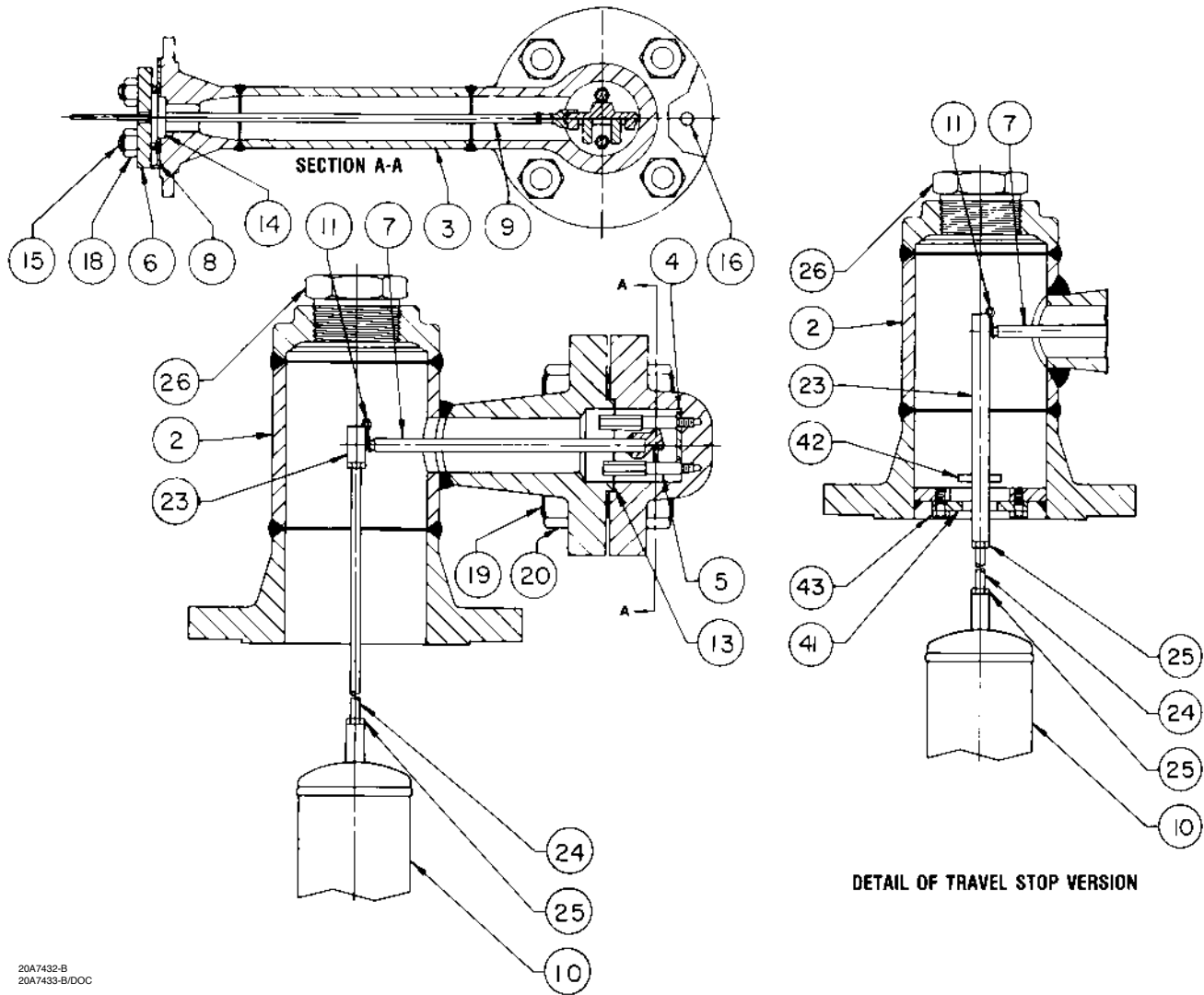
5. Install the driver bearing, displacer rod assembly, and bearing bolts (key 5) into the torque tube arm. Install a new arm gasket. Install the torque tube arm on the sensor head or process vessel and secure it with the proper bolting (keys 19 and 20).
6. Install the torque tube assembly. Install the displacer.
7. Install the sensor head and controller/transmitter. Calibrate the controller/transmitter following the procedures given in the controller/transmitter instruction manual.

## Parts Ordering

Whenever corresponding with your Fisher sales office about this equipment, always mention the sensor serial number. Each sensor is assigned a serial number which is stamped on a nameplate (key 54, not shown) attached to the torque tube arm. This same number also appears on the controller/transmitter nameplate when a complete controller/transmitter-sensor unit is shipped from the factory. When ordering a replacement part, be sure to include the 11-character part number from the following parts list.

### Note

**Use only genuine Fisher replacement parts. Components that are not supplied by Fisher should not, under any circumstances, be used in any Fisher instrument. Use of components not supplied by Fisher will void your warranty, might adversely affect the performance of the instrument, and might jeopardize worker and workplace safety.**



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20A7433-B/DOC

Figure 5. Type 249BP Sensor Construction

**Note**

Fisher does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, or maintenance of any Fisher product remains solely with the purchaser and end-user.

**Parts List**

Key Description Part Number

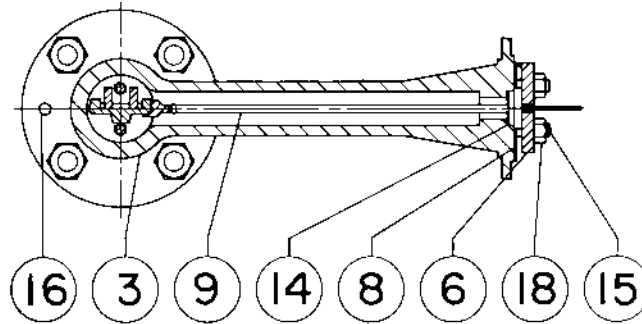
**Sensor Common Parts**

- 2 Sensor Head  
**For 249BP, 249CP, 249P**  
(If a part number is required, contact your Fisher sales office.) Not req'd for 249V
- 3 Torque Tube Arm  
**For 249V**  
(If a part number is required, contact your Fisher sales office.)
- 4 Driver Bearing, S31600 1K539536042
- 5 Driver Bearing Bolt, S31600 (2 req'd) 1K539435072

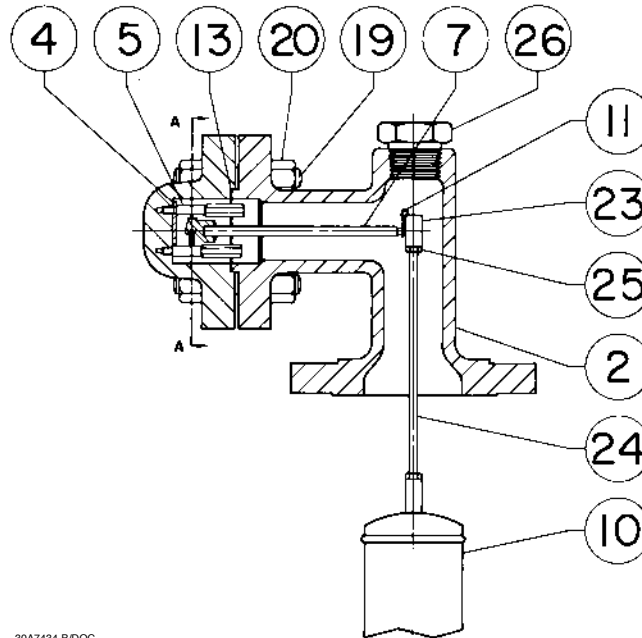
**Parts Kits**

Key	Description	Part Number
<b>SENSOR PARTS KIT</b>		
	Kit contains keys 9, 11, 13, 14	
	<b>For Type 249BP</b>	R249X000012





SECTION A-A

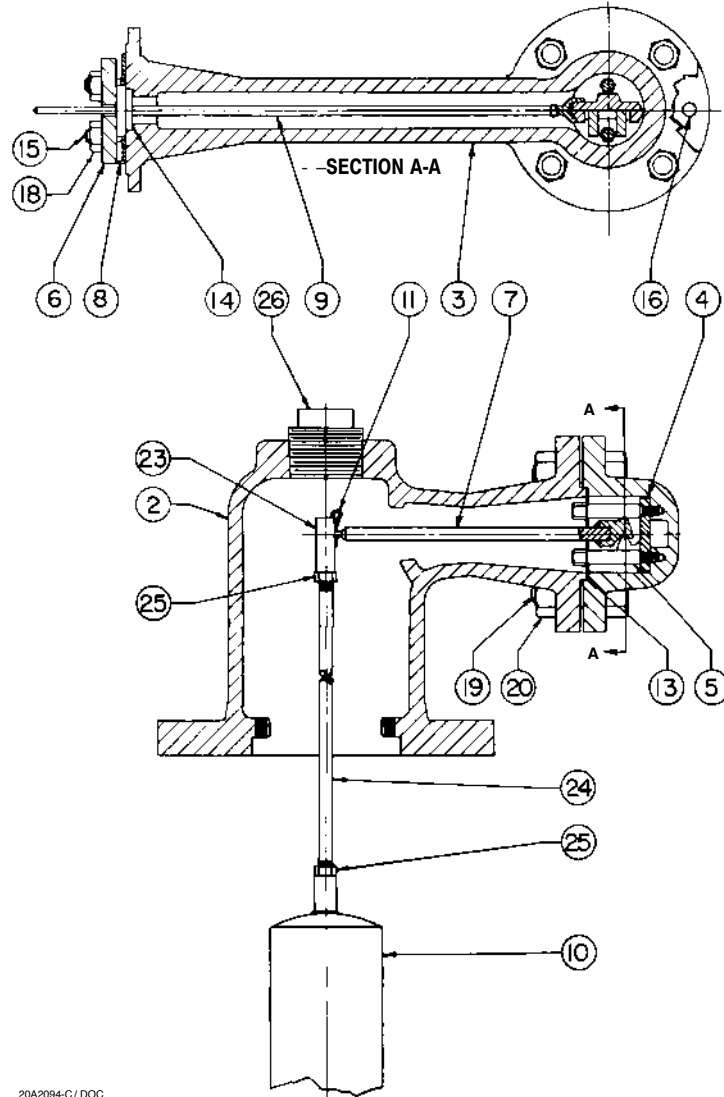


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Figure 6. Type 249CP Sensor Construction

Key	Description	Part Number	Key	Description	Part Number
6	Retaining Flange (If a part number is required, contact your Fisher sales office.)		9*	Torque Tube Assy <sup>(1)</sup> (cont'd)	
7	Rod/Driver Assy, S31600 <b>For 249BP</b> S31600 <b>For 249CP</b> <b>For 249P</b> <b>For 249V</b>	1B5461000A2 1F9579000A2 1B5698000A2 1B5787000A2		<b>For 249CP</b> S31600 Std wall Heavy wall	1K4505000A2 1K4503000A2
8	Positioning Plate, S31600	1B812325082		<b>For 249P</b> N05500 Std wall Thin wall	1K4499X0012 1K4501X0012
9*	Torque Tube Assy <sup>(1)</sup> <b>For 249BP</b> N05500 (Nickel Alloy, K-Monel) Std wall Heavy wall Thin wall	1K4493X0012 1K4497X0012 1K4495X0012		<b>For 249V</b> N05500 Std wall Thin wall	1K4499X0012 1K4501X0012

\*Recommended spare parts  
1. This part is available in a wide variety of materials of construction, part dimensions, or other specifications. Listed here are standard or typical materials, dimensions, or specifications. Contact your Fisher sales office for assistance in selection of specific materials, dimensions, or specifications.



20A2094-C / DOC

Figure 7. Type 249P Sensor Construction

Key	Description	Part Number	Key	Description	Part Number
10	Displacer <sup>(1)</sup>		10	Displacer <sup>(1)</sup> (cont'd)	
	<b>For 249BP, 249CP</b>			<b>For 249P (cont'd)</b>	
	3 inch X 14 inches (1600 psi), S30400	15A3848X012		1.75 inch x 32 inches (4200 psi) S30400	15A4666X032
	3 inch x 14 inches (1600 psi), S31600	15A3848X022		1.75 inch x 32 inches (4200 psi) S31600	15A4666X022
	2 inch x 32 inches (1500 psi), S30400	15A4586X012		1.9062 inch x 32 inches (3400 psi) S30400	15A4581X042
	2 inch x 32 inches (1500 psi), S31600	15A4586X022		1.9062 inch x 32 inches (3400 psi) S31600	15A4581X012
	1.5 inch x 60 inches (1800 psi), S30400	15A5017X042		<b>For 249V</b>	
	1.375 inch x 72 inches (1400 psi), S30400	1C1685000A2		3 inch x 10 inches (1600 psi), S30400	
	<b>For 249P</b>			(vertical or horizontal mounting)	1J7062000A2
	2.75 inch x 14 inches (6000 psi) S30400	1L7548000A2		3 inch x 10 inches (1600 psi), S31603 (NACE)	
	2.75 inch x 14 inches (6000 psi) S31600	1L7548X0012		(vertical or horizontal mounting)	1J7062X0022
	2.875 inch x 14 inches (4000 psi) S30400	1L9152000A2		3 inch x 14 inches (1600 psi), S30400	15A3848X012
	2.875 inch x 14 inches (4000 psi) S31600	1L9152X0012		3 inch x 14 inches (1600 psi), S31600	15A3848X022

\*Recommended spare parts

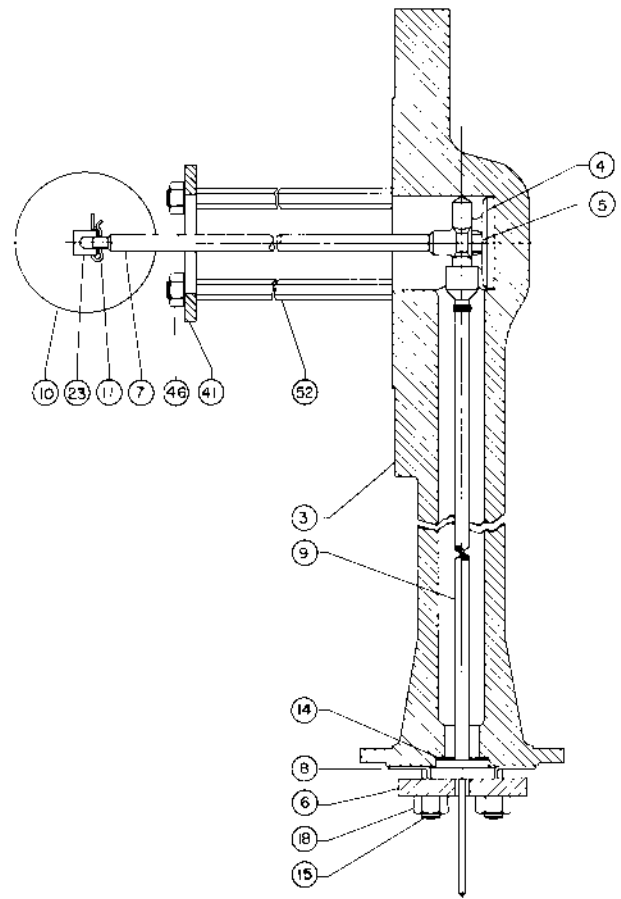
1. This part is available in a wide variety of materials of construction, part dimensions, or other specifications. Listed here are standard or typical materials, dimensions, or specifications. Contact your Fisher sales office for assistance in selection of specific materials, dimensions, or specifications.

# Instruction Manual

Form 1803  
September 2004

# Cageless 249 Series Sensors

Key	Description	Part Number
10	Displacer <sup>(1)</sup> (cont'd) <b>For 249V (cont'd)</b> 3 inch x 14 inches (1500 psi), S31603 (NACE) 15A3848X312 2 inch x 32 inches (1500 psi), S30400 15A4586X012 2 inch x 32 inches (1500 psi), S31600 15A4586X022 2 inch x 32 inches (1500 psi), S31603 (NACE) 15A4586X162 1.375 inch x 48 inches (1800 psi), S30400 15A5007X022 1.5 inch x 60 inches (1800 psi), S30400 15A5017X042	
11*	Cotter Spring <sup>(1)</sup> , N04400 (Monel) (2 req'd)	1A517942022
13*	Arm Gasket <sup>(1)</sup> <b>For 249BP, 249CP</b> thru Class 600, graphite/SST <b>For 249P</b> Class 900 & 1500 graphite/SST	1E5629X0072 1A1297X0022
14*	Tube End Gasket <sup>(1)</sup> <b>For 249BP, 249CP, or 249V</b> thru Class 600, graphite/SST <b>For 249P</b> Class 900 & 1500 graphite/SST	0Y0876X0052 0Y0876X0022
15	Stud Bolt <sup>(1)</sup> , steel B7 (4 req'd) <b>For 249BP, 249CP, 249V</b> (249V thru Class 600) <b>For 249P</b> Class 900 & 1500	12A8835X132 1K6235X0152
16	Groove Pin, S31600 <b>For 249BP, 249CP, 249P</b>	1A361828992
18	Hex Nut <sup>(1)</sup> , steel B7 (4 req'd) <b>For 249BP, 249CP, and 249V</b> thru Class 600 <b>For 249P</b> Class 900 & 1500	1A377324072 1A3772X0892
19	Bolt Stud <sup>(1)</sup> , steel B7 (4 req'd) <b>For 249B, 249CP</b> thru Class 600 <b>For 249P</b> Class 900 & 1500	1A354431012 1A4212X0042
20	Hex Nut <sup>(1)</sup> , steel (8 req'd) <b>For 249BP, 249CP</b> thru Class 600 <b>For 249P</b> Class 900 & 1500	1A376024072 1C1727X0592
23	Displacer Stem End Piece <sup>(1)</sup> , S31600 <b>For 249BP, 249CP</b> w/out travel stop <b>For 249BP</b> w/travel stop <b>For 249P</b> w/out travel stop <b>For 249V</b> Stem End Piece Rod Connector	1A393335072 1E920235072 1A393335072 1A943635072 1A943135072
24	Displacer Stem <sup>(1)</sup> When ordering a replacement displacer stem, specify length and desired material.	
25	Hex Nut <sup>(1)</sup> , B8M (2 req'd)	1A391535252
26	Pipe Plug <sup>(1)</sup> , steel <b>For 249BP</b> <b>For 249CP</b> <b>For 249P</b>	1A398524182 1B765638992 1A444228992
35	Heat Insulator Ass'y (use only when specified)	22A0033X012
36	Shaft Coupling (for heat insulator ass'y) Use only when specified	1A577935032



30A7435-C/DOC

Figure 8. Type 249V Sensor Construction

Key	Description	Part Number
37	Shaft Extension (for heat insulator ass'y) Use only when specified	1B681540022
38	Set Screw (for heat insulator ass'y) (2 req'd) Use only when specified	1E6234X0022
39	Cap Screw (for heat insulator ass'y) (4 req'd) Use only when specified	1A3816K0012
40	Cap Screw (for heat insulator ass'y) (4 req'd) Use only when specified	1V239528982
41	Travel Stop Plate, steel <b>For 249V</b> <b>For 249BP</b>	1J731028992 1E913136072
42	Groove Pin (travel stop pin), SST <b>For 249BP</b> not req'd for 249V	1A524635032
43	Cap Screw, hex head, steel (2 req'd) <b>For 249BP</b>	1A391724052
44	Stud Bolt <sup>(1)</sup> , steel B7 <b>For 249BP</b> w/2-inch top flange, Class 150 (4 req'd) w/2-inch top flange, Class 300 (8 req'd)	1J698131012 1L515131012

\*Recommended spare parts

1. This part is available in a wide variety of materials of construction, part dimensions, or other specifications. Listed here are standard or typical materials, dimensions, or specifications. Contact your Fisher sales office for assistance in selection of specific materials, dimensions, or specifications.

